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A Vital Link:

**Health and the Environment
in Canada**

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Poisoning

Poisoning from environmental contaminants, while infrequent, is possible. Certain agents common in the environment can cause either acute or chronic poisoning.

While extreme cases of poisoning – usually occurring when a person directly ingests a toxic or poisonous material – may cause death, lesser exposures will interrupt body processes or damage the body. Toxins may affect one place in the body or several sites or systems.³⁹

Some substances manufactured to be used as poisons, such as insecticides and herbicides, may be detrimental to people working

improperly with them, or using them indiscriminately at home.

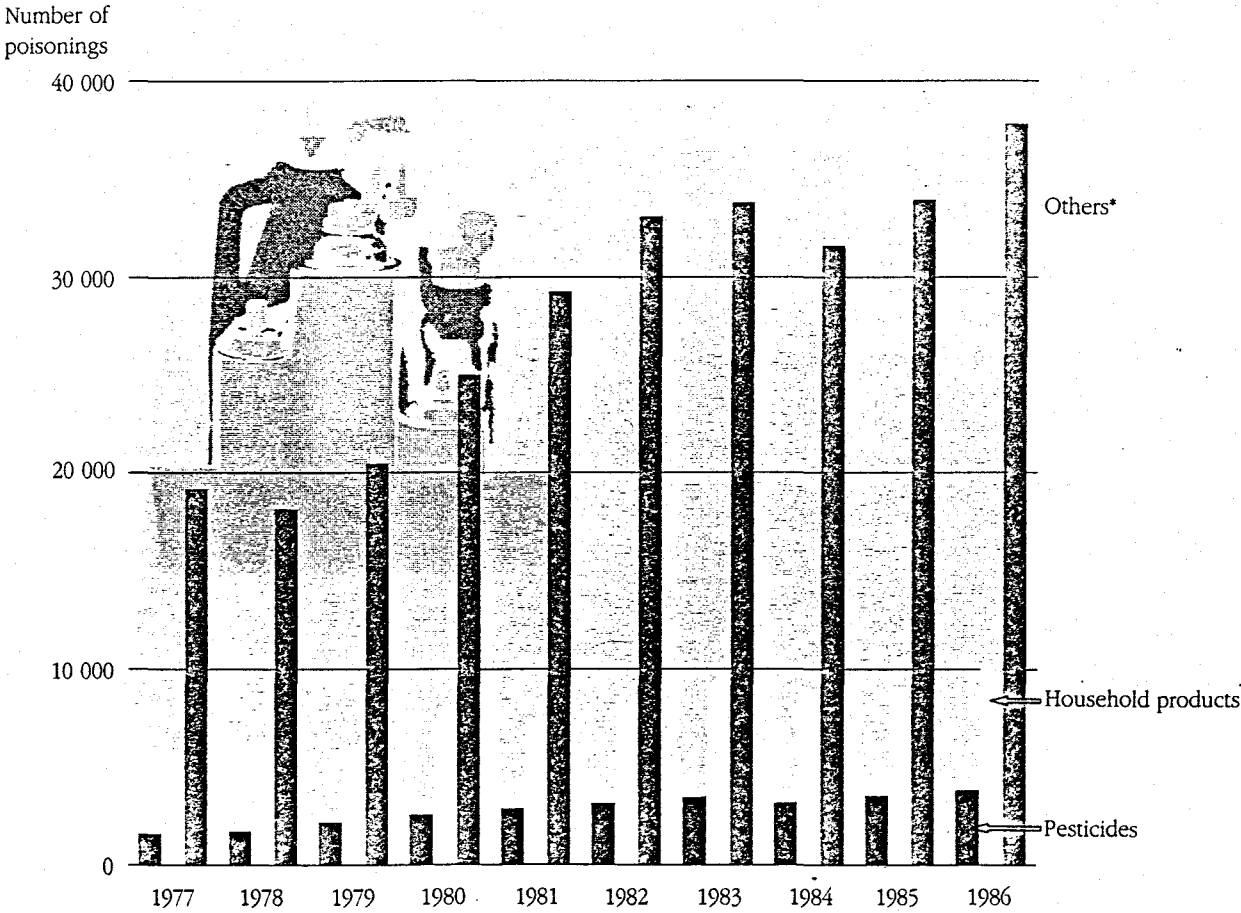
Many heavy metals such as lead, mercury and cadmium are also poisons. Arsenic, while not technically classed as a heavy metal, also falls into this category. The detailed effects of these poisons in the human body vary considerably, but all may affect the nervous system. People working or living in certain environments may be particularly exposed. For instance, researchers have found higher levels of lead in the blood of children living in cities.⁴⁰

The number of reports of poisonings from non-drug chemicals has increased. Two of the environmental contaminants of health significance, pesticides and household

products, contribute to this overall trend (see figure 10).⁴² However, it is important to note that this trend may be a result of increased reporting rather than an actual increase in poisonings.

Chronic exposure to low levels of environmental contaminants has recognized effects in growing children. Many studies indicate that children exposed to lead at relatively low levels, for example, may experience developmental problems. There are, however, varying opinions about the extent to which chronic exposure affects learning and behaviour.⁴³ Chronic exposure to high levels of any heavy metal may have serious consequences.

Figure 10
Non-Drug Related Poisoning Cases in Canada⁴²



* The category "Others", includes cosmetics, hydrocarbons, gases, vapours, hobby materials, glues, toys, plants and foods.

Extreme problems in development as well as interruption of normal nerve and motor responses such as eye and hand co-ordination are typical.

Fluoride is another potential poison, and presents an interesting case. It is a naturally occurring element that is also released by some industrial processes. At low levels, fluoride is beneficial to human health; it increases the resistance of tooth enamel to acids that cause cavities. Because of this, many municipalities add fluoride to their water supplies.⁴⁴ In high concentrations, though, it may have harmful effects. Therefore, municipalities carefully regulate water supplies,

keeping fluoride concentration at acceptable levels set by the *Guidelines for Canadian Drinking Water Quality*.⁴⁴

Genetic Change

Some environmental contaminants may have a part in altering genetic material or preventing normal cell development or regeneration.

One type of agent that causes genetic change in an organism is a mutagen; it may cause birth defects or cancer. Certain pollutants in the environment (such as cadmium and ionizing radiation) are mutagens. Teratogens are agents that cause birth defects, and carcinogens are agents that cause cancer. Teratogens are relatively few in number, and

usually do not appear in concentrations sufficient to do serious damage. Radiation, cadmium, alcohol, and tobacco smoke, among others, act as teratogens in high doses.

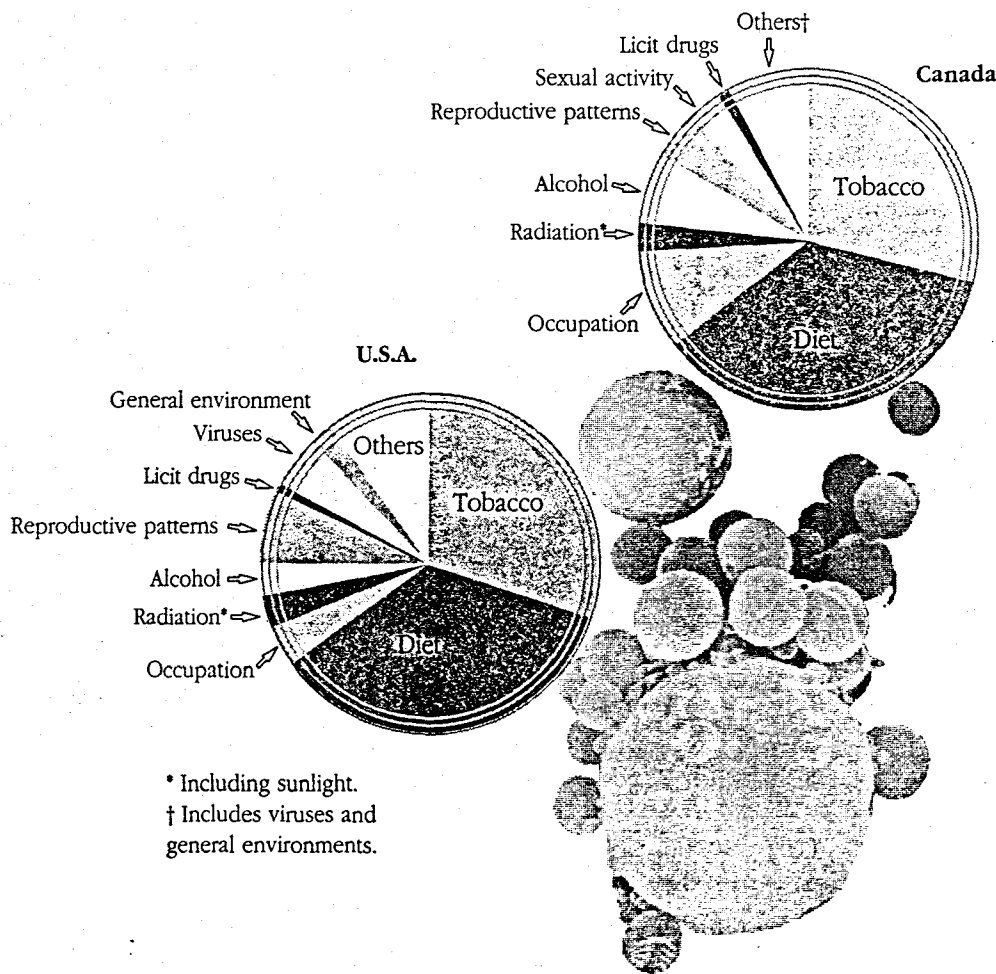
The presence of chemical carcinogens in the environment is at the centre of public discussion on how environmental contaminants affect human health. However, since the number of known cancer-causing agents is very small, some people argue that the attention paid to carcinogens is disproportionate in light of other important environmental issues. In fact, it has been estimated that general environmental factors, excluding sunlight, account for approximately two percent of cancer deaths (see figure 11).

Allergies

Our bodies are also significantly disrupted by allergens, (substances causing allergic reactions). The reactions may vary significantly from person to person but in some cases they may be debilitating.

A number of materials may trigger allergic responses in certain people. These include bacteria, fungi, pollens, dust, bee stings, and penicillin, as well as some foods and food additives. Some people develop allergic-like reactions to high concentrations of chemicals in their work or living environment.

Figure 11
Estimates of the Percentage of Cancer Deaths in Canada and the United States from Known Causal Factors^{45, 46, 47}



Environmental Sensitivity

There has been growing concern about the unusual sensitivity some people display to low levels of chemicals and other substances both indoors and outdoors. This rare syndrome has become known as environmental sensitivity, but is also called by other names: multiple chemical sensitivities, hypersensitivity, twentieth-century illness, and universal allergy.

The symptoms of this condition could result from any number of causes and vary from person to person, so there is no standard clinical description of the illness. Some symptoms are fairly subjective and include unexplained weakness, generalized anxiety, fatigue, tremor and sweating, depression, palpitations, headache, bloating, gas, intolerance to food, and muscle and chest pains. Other symptoms are more objective: intolerance to medication and alcohol, excessive sneezing, eye-watering, coughing, skin rashes, and constipation.⁴⁸ In many cases these physical symptoms may also result in social and psychological stresses.

Since such symptoms are hard to measure, the identification and treatment of this condition are also difficult. Recognizing this, participants in a workshop on the topic recommended that the treatment of environmental sensitivity should be considered on a case-by-case basis. The workshop in May 1990 was organized by Health and Welfare Canada's Laboratory Centre for Disease Control.⁴⁹ Other recommendations included the need to educate the public and professionals about environmental sensitivity, as well as the need for health care professionals to acknowledge the disabilities associated with the syndrome, and to convey their compassion for people afflicted with it.

There is no consensus on the physical triggers or irritants that provoke sensitivity, although possible triggers in the home include tobacco smoke, food ingredients and foods themselves – nuts, for example – as well as perfumes, formaldehyde, gases given off by carpets, house dust, mould, and animal dander. One theory is that the triggering of environmental sensitivities is similar to an allergic reaction, where symptoms result from exposure to particular substances or environments. Indeed, sensitive people may react to uncommonly small doses of a given substance.⁴⁹ In an attempt to identify problem substances, researchers test people with extreme environmental sensitivity in special environmental care units designed to remove as many triggers from their surroundings as possible. Suspected triggers and irritants are then introduced in a controlled manner to test for reactions.⁴⁸

Environmentally sensitive people may experience adverse reactions either through a single exposure to an irritant or chemical or prolonged low-level exposure. For an irritant to trigger the symptoms of sensitivity, it must be absorbed by the skin, lungs or stomach.

An example of how someone can become sensitized is the occasional person who has been exposed to a chemical spill on the job and subsequently develops pneumonia. Although a later X-ray of the person's chest shows clear

lungs, shortness of breath and chest pains may increase. At home, the worker feels worse if she or he smells chemicals. When the worker is back on the job and again exposed to fumes, acute symptoms return. The person now is sensitized to react to even small exposures to the same or a related substance.

Most environmentally sensitive people report improvement when they adopt lifestyle changes that enable them to have clean air, clean water and foods low in chemicals. They should try to avoid any substance identified as triggering their condition. Generally, factors that should be controlled include household chemicals, cigarette smoke, fumes, changes in temperature and humidity, dust and dirt from heating and cooling systems, and mould and mildew. Some sensitive people respond well when they live in special housing units that have very low levels of airborne pollutants.